## **CLAIMS**:

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## We claim:

1	1. A channel assignment scheme for a node comprising:					
2	assigning a first channel to an uplink for a node;					
3	assigning a second channel for a downlink for a node; and					
4	maintaining the first channel and the second channel distinct from uplink channel					
5	of an upstream node					

- 2. The method of Claim 1, wherein each interface is half-duplex.
- 3. The method of Claim 1 wherein the channels are frequency channels.
- 1 4. The method of Claim 1 wherein the channels are different spreading codes 2 in a spread-spectrum CDMA system.
- 1 5. The method of Claim 1 wherein the channels are different polarizations of 2 the transmitted waveform.
- 1 6. The method of Claim 1 wherein the channels are different spatial 2 signatures as determined by a smart antenna or adaptive antenna array at the receiver.
- 1 7. The method of Claim 1, further comprising:

2	assigning of the first channel and the second channel for the node based on a						
3	number of hops from the node to a distinguished node.						
1	8.	The method of claim 7, wherein there are multiple downlink nodes and the					
2	multiple dow	nlink nodes use multiple downlink channels.					
1	9.	The method of Claim 7 wherein the number of hops is determined from					
2	information o	carried in the routing packets.					
1	10.	The method of Claim 9, wherein the routing information is propagated in					
2	the network of	on some or all of the channels available in the system.					
1	11.	The method of Claim 9, wherein the routing information is propagated in					
2	the network	on a dedicated channel.					
1	12.	The method of Claim 1 wherein the uplink channel of the node is					
2	assigned by the default gateway of the node.						
1	13.	The method of Claim 12, wherein assigning the downlink channel for a					
2	node comprises:						
3	determining a plurality of potential channels for communication;						
4	sendi	ng a reservation packet to trigger testing of each of the plurality of potential					
5	channels; and	d					
6	deter	mining a best channel based on responses to the reservation packet.					
1	14.	The method of Claim 13 wherein testing comprises:					

2	each downstream node sending a plurality of packets to the node; and							
3	evaluating a channel with the best link quality							
1	15. The method of Claim 14 wherein link quality is estimated by the							
2	throughput on the link.							
1	16. The method of Claim 14 wherein link quality is estimated by measuring							
2	the packet error rate on the link.							
1	17. The method of Claim 14 wherein link quality is estimated by the signal-							
2	to-noise ratio observed on the link.							
1	18. The method of Claim 14 wherein link quality is estimated by the latency							
2	observed on the link.							
1	19. A method to determine a quality of a link comprising:							
2	sending a predetermined number of packets to an originating node in response to							
3	a reservation packet; and							
4	deducing, at the originating node, a packet error rate based on a number of							
5	packets received without error; and							
6	assigning best quality channel to the downstream connection from the							
7	originating node based on the packet error rate.							
1	20. The method of claim 19, wherein the best quality channel comprises a							
2	plurality of downlink channels, and each downstream connection to a downstream node							
3	uses one of the plurality of downlink channels.							

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1	21. A method to determine a quality of a link comprising:							
2	sending a predetermined number of packets to an originating node in response to							
3	a reservation packet; and							
4	deducing, at the originating node, a throughput rate based on the packets received							
5	without error; and							
6	assigning a best quality channel to the downstream connection from the							
7	originating node based on the observed throughput.							
1	22. The method of claim 21, wherein the best quality channel comprises plurality							
2	of downlink channels, and each downstream connection to a downstream node uses one							
3	of the plurality of downlink channels.							

- 23. The method of claim 22, wherein the determination is performed periodically, and on all downstream links from a given node and on all available channels in order to determine the choice of channel or channels for the downlink for which the best link quality is achieved.
- 24. A method to allocate communication channels that results in enhanced
  resistance to external interferers in a wireless mesh network comprising:
  periodically evaluating a downstream channel by receiving a plurality of packets
  from each downstream node for each of a plurality of channels; and
  selecting as the downstream channel a best of the plurality of channels based on
- 6 link-quality.

- 1 25. The method of Claim 24, wherein the method results in a channel
- 2 allocation for the system that eliminates interference between adjacent links or next-to-
- 3 adjacent links.
- 1 26. The method of Claim 24, wherein the communications channel to be used
- 2 on a link (connecting two nodes) is assigned by the node that is at a smaller number of
- 3 hops to the access point.
- 1 27. The method of Claim 24, wherein all the links comprising the downlink
- 2 from a given node are assigned to the same channel.
- 1 28. The method of Claim 24, wherein the links comprising the downlink from
- 2 a given node may be assigned to different channels.
- 1 29. The method of Claim 24, wherein the channel allocations for the system
- 2 may change in response to the presence of an interferer or jammer transmitting on one or
- 3 more of the channels used by the system.
- 1 30. The method of Claim 24 wherein the presence of an interferer or a jammer
- 2 is inferred based on the link quality observed on each link.